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Addressing the Inadequacies of Information Available on the Internet: The Prospect for a Technical Solution

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ADDRESSING THE INADEQUACIES OF INFORMATION AVAILABLE ON THE
INTERNET: THE PROSPECT FOR A TECHNICAL SOLUTION

A Synthesis Project Presented

by

ALAN I. GOLDMAN

Submitted to the Office of Graduate Studies, University of Massachusetts Boston,
in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

June 1999

Critical and Creative Thinking Program

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ABSTRACT

ADDRESSING THE INADEQUACIES OF INFORMATION AVAILABLE ON THE INTERNET: THE PROSPECT FOR A TECHNICAL SOLUTION

June 1999

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In the past ten years the Internet has been the carrier and transmitter of vast amounts of information. Most of it has never been subjected to peer review or even casual review and has therefore been the source of misinformation. Additionally, there is need for more researchers to utilize critical thinking techniques of evaluating the credibility of sources.

This paper chronicles my critical and creative thinking processes and results regarding these three areas of the information problems that are prevalent on the Internet. The first area is the problem of bad, biased or incorrect information including hoaxes and scams. I used critical thinking techniques to analyze these areas to provide a basis to define a problem to be solved.

The second area of concern is the critical thinking process that should be used to evaluate the reliability of resources and the credibility of information. This process can help prevent the Internet user from being a victim of bad or biased information.

The third area deals with similar problems of information that were solved both inside and outside the Internet that could provide bases for solutions. Here, I used critical thinking in regard to other possible outcomes. I discuss what other industries such as consumer product review companies and academia have done to deal with similar problems. I take a look at Underwriters Laboratories and others who devised systems that verified the quality of product as well as research methods that assure quality of information.

I developed a conceptual framework for a software-based solution that can help assure that high quality information is presented on the Internet. I used a process of divergent and convergent thinking to arrive at a best solution. The solution allows for those who use the Internet data to leave information with or without leaving evaluation comments that describe the quality and usefulness of what was presented. The results of this user feedback are not only available to others who search for this information, but it can be presented in a prioritized form from most reviewed to least reviewed thus saving researchers time and effort while assuring a better quality of information.

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CHAPTER 1

INTRODUCTION

I have spent most of my adult life in the high technology business holding positions in sales, sales management, systems design, and systems development. I have been a CEO and owner. I have closely observed the transitions from applications written in (programming languages known as) machine code, assembler, FORTRAN, COBOL, Visual Basic and, most recently, in Powerbuilder. I have used many operating systems available for Mainframe computers, Mini-computers, and PC networks. Yet, only now, with the advent of the Internet, do I see radical changes in the ways we can conduct our day to day living. The Internet is the scaffolding for a foundation of knowledge that civilization can use to both increase knowledge at a faster rate and provide for a stable basis of information to accelerate technological and social development.

I would like to explore several solutions to these problems which include from procedural approaches and, more importantly, technical approaches. My thesis is that a technical approach may be the shortest, best and cheapest road to a solution.

Critical thinking requires that the facts upon which analysis takes place are accurate, unbiased and fully presented. A February 22, 1999 article in the Boston Globe written by Adam Pertman told of a Professor who gave an assignment to graduate students that was based on an Internet site that purported to have the attributes necessary

for information to be used in critical thinking. After the assignments were done the Professor discovered that not only was the site bogus but all the information was either biased, incomplete or inaccurate. The Professor erred in not ascertaining the quality of the site just as I and countless other users all over the world have.

This problem of bad information perplexed me and my own failure to qualify Internet based information became the major impetus to see how a rigorous method of ascertaining high quality information can be used in order to assess the quality of any Internet site.

EVALUATION TECHNIQUES

The need to evaluate sites is clear. We know that the sites differ dramatically in quality, thus necessitating the need to use both existing techniques and new techniques for evaluation. There are five traditional evaluation criteria that can be used to evaluate printed material that apply in the area of web research. In many ways these evaluation functions are supportive of good critical thinking and research.

Check For Accuracy

The first is checking for accuracy. The searcher must make sure that the information presented is reliable and free from errors. Hopefully, the author(s) had editors and fact checkers. The searcher should make sure that there are sources that support the text and that these sources are reliable. These sources should be in the original language of publication to insure that translation errors are absent.

Qualification Of Authors

The next area of concern is the authority of the author(s). They must be qualified to write on the subject. From a critical thinking point of view, this helps to assure that the author has been exposed to the milieu of the subject to the degree that he or she can write clearly and completely about the subject. This may be checked through the credentials cited in the article. Check for other publications by that author and degrees earned by the author. To help in this process read the biographical notes on the author and check for any book reviews that may be available on other publications by the author. This information may be in the web pages.

Freedom From Bias

The information should be presented in such a way that bias is minimized and the author does not seem to be trying to sway the opinion of the reader. This is of utmost importance to the critical thinker doing research. In order to verify freedom from bias, the searcher must verify that all sides of issues are presented fairly and completely. This is one area where the author should be telling the truth, the whole truth and nothing but the truth. Anything less is tantamount to distortion and bias. The arguments that are made must be sound. While it is necessary to allow for and consider several points of view, the issues that are argued should be done in a way that is not using fallacious arguments. Slippery slope and other fallacious argument forms are no strangers to biased publications.

Currency Of Information

The currency of the information presented is important and critical when the subject matter is politically or technologically based. While historical information is necessary to avoid bias, some of the dates of the articles and the cited references should be within two years of reading. Currency is especially important in the areas of technical research. Good articles will cite dates and references clearly in the article. From a critical thinking point of view there may even be bias when an author digs deep into the past for references on subjects that should be dealt with using current information. An example of this is the possibility that old information is used when recent studies have proven it to be false.

Coverage

The reader must look for the topics covered in the article and also determine the depth to which the subject matter is explored. In this area, the reader must also look at the way in which data is collected and reported. The process must be examined for accuracy.

I have used the above mentioned techniques and realized significant time savings in terms of retrieval especially from using www.metacrawler.com. I prevented the use of invalid information by following the five steps mentioned above, but I did not save time. While there are clear benefits to training for an efficient approach, the overall quality of realized information falls short of what was desired.

MY CREATIVE AND CRITICAL THINKING PROCESSES

When I looked for solutions to the problem I entered a process that consisted of looking at what others did in other industries and looking for possible adaptation of ideas. This process showed that others did indeed institute evaluation processes similar to those just mentioned. While such evaluation processes worked in other arenas, the Internet was too vast, with practically no barriers to entry for information providers that were good or bad.

I realized that simple transference of approach would not solve the problem. I enlisted the SCAMPER technique (Eberle, 1971) to explore creative solutions in an orderly way along with brainstorming. SCAMPER refers to an approach with the following parts:

- Substitute some aspect of it
- Combine elements with something else
- Adapt or alter an aspect of it
- Modify- Magnify Minify an aspect of it
- Put some part of it to other uses
- Eliminate an aspect of it
- Rearrange - Reverse an aspect of it

The SCAMPER technique can apply to anyone of just about any age who wants to think creatively about narratives, products, inventions or anything that is subject to divergent thinking. Each of the aforementioned strategies is self explanatory. For example, early in the twentieth century someone combined the elements of an automobile and a cart and created the first truck. Then, later another combined a hitch to the rear of a trailer truck to allow for two trailers to be hauled at once. Each phase of SCAMPER works as it is described.

In my creative process the functions of combining, modifying - magnifying - minifying, and adapting led me to design conclusions that could facilitate a viable solution. I began my creative process by combining elements to create possible solutions. I considered new browsers, modified browsers, special applications to verify sources, add-on files, active user reviews, passive user reviews, and taking no action, to name a few. I reviewed the results through convergent thinking and came up with some solutions mentioned below from the many initial possibilities

I then had to look at the solution and its feasibility. Analyzing the size and scope aspect of each solution could help determine required resources. If the resource requirements were too high I would utilize a minimize process to come up with a different solution. This led me to refine my solution to a product and approach that was feasible in today's environment. Indeed, without minimizing my initial favored solution the implementation costs would have been astronomical if the monetary and human resources could be found.

Lastly, I adapted a minimized solution and implementation plan to a manageable local area which would be a representation in microcosm of the Internet worldwide information environment. This type of Internet problem precludes a perfect solution but does allow for one that neither takes up much of the user's time nor requires vast amounts of money or patience.

CONVERGENT THINKING ABOUT NON-VIABLE SOLUTIONS

An example of a non-viable solution is that offered by *WC3 World Wide Web Consortium* whose site is at www.W3.org. They provide a service that for three hundred

dollars will review content of sites (within a certain size range) and apply the evaluative techniques mentioned above. This led to the evaluative part of my critical thinking process. Looking closely at the solution there were several fatal problems. The first is that there were no guarantees that the reviewers would have any knowledge of the subject matter being reviewed. This is of paramount importance if a quality review were to take place. Without subject knowledge one could approve of the authors, credentials and other factors, yet the tract itself may be terrible and a piece of work not typical of the author. Another problem is that of cost. If we reviewed all the sites that are currently on the Internet it would take many billions of dollars to conduct these reviews. Lastly, even if we had the disposable money to do this several problems will emerge. We would have to determine priorities, assign people, etc. Even after all the planning many years would pass before our limited human resources could complete such a project. I analyzed each possible solution in terms of general merit as well as the technical, legislative, private and economic issues associated with its development and implementation.

CHAPTER 2

SHORTCOMINGS IN THE INTERNET'S INFORMATION AND OTHER PROBLEMS

A critical thinking approach to assessing information shows that there are problems associated with the Internet that threaten the foundation of knowledge and the quality of communication due to the presence of biased, incomplete, incorrect and illegal information.

PERSONAL EXPERIENCE

Recently I conducted research on the anti-trust action against Microsoft Corporation. I used several search engines through a search consolidation site. I printed out several of the hits that seemed appropriate at the first glance. Several hundred pages of printed material turned up at least a hundred pages of severely biased information that on its face seemed scholarly and well researched. The web page titles suggested that an open forum and articles providing multiple view were contained within. In actuality many of these authors appeared on the sites of very conservative organizations that are

unabashed opponents of any form of government interference in business. Had I not searched their names I would have been a victim of bias.

Initially, I thought that I had eliminated the sites that were inappropriate. I examined my search statement that had the words "Microsoft" and "anti-trust" as key words. The search engines obviously pulled up a lot of sites that had these key words in their HTML (the de facto standard for Internet page programming and design) pages. The engines had no way of knowing that some sites had bad or biased information and other sites had valid accurate information. Most of the presented sites were rejected at the listed level because they were not relevant and yet many that I printed I rejected due to poor content.

It is at first puzzling to see so much inappropriate information proliferated on the web until one compares the storage function of the web to that of a library. A library consists of books, magazines, videos and tapes that are published or produced by organizations whose staff consists of editors. These people scrutinize the media before they publish it. They are the gatekeepers of hard publishing and help to maintain standards of scholarly and entertainment works. There are also those who publish pornographic and racist materials. Such publications are usually clear to the naïve reader to be exactly what they are.

In the case of publications that are published by reputable houses there are obvious differences in the orientation and quality of thought. A public library will have writings ranging from Marx to Goldwater and from Billy Graham to Hugh Hefner. Depending on one's orientation half of these subject areas may be in bad taste but there is the guaranteed constitutional right of free speech so all opinion may be read.

On the web, there are similar contributions available as would be found in a library mentioned above. In addition to sites of substance with differing points of view the web has countless sites with many points of view that are not of any quality. Today, anyone who signs up at an Internet Service Provider (ISP) for access to the Internet may be offered up to five megabytes for a home page free of charge. While the Internet user usually agrees to abide by certain restrictions in terms of what is placed on the page, often that user sets up low or no quality information and sometimes violates the agreement that is consummated by a mouse click and whose only recourse upon breach is to cease providing that user a service.

At a higher level, a group of individuals or a single individual may buy or rent server equipment or disk space on a server and post their own site. In this case, there may be no agreements in terms of what may or may not be presented in terms of content. Savvy authors who want their story to be read will fill the pages with lots of key words so as to enhance the possibility that a net surfer will view their page.

This gets more interesting when we add the prospect of making money to the equation. Sites that sell advertising space may get paid up front or according to the number of hits (mouse clicks on a page on the Internet browser) and purchases or any combination thereof. If a site wants revenue they will try to make the site more interesting and more likely to be included high in the result list of searches by enhancing the key word lists in their pages. This is very typical of pornographic sites that pop up in searches like "white house" or "first lady". House and lady are normal inclusions in smut sites. When one searches in an electronic ISBN or any Author, Title or Subject catalogue for the same items, no smut references appear in the search results and nearly all

references are extremely close to the requested subject. Pornographic results are the bane of many parents who have a right to censorship over their children. Web-savvy web parents will get a web filter such as Cyber-Patrol.

The result of the above observations is that there are two major negative outcomes. The first is that the knowledge taken from the Internet has to be very carefully scrutinized before the researcher uses it. The second is that even in the best of circumstances the Internet as a source of knowledge without a gatekeeper can waste tremendous amounts of time and resources due to bad information or inappropriate hits.

BIASED INFORMATION

The user who takes information off the Internet and who is not careful to properly evaluate it may conduct research whose results and/or conclusions are not sound. While they may seem valid, based on bad information, the result is still harmful to the building of knowledge overall. The acceptance of knowledge whose foundation is weak is like the building of the Titanic hull. The December 12, 1998 edition of the Boston Globe reported that the rivets used to assemble the outer hull of the Titanic were below grade due to excessive amounts of impurities in the steel. The high quantity of these impurities severely weakened the shear strength of the hull plates so that the iceberg literally popped the rivets to create a larger than survivable gash in the hull. Perhaps a smaller hole would have provided time enough for rescue ships to save the passengers. Clearly, the smallest part of anything is still important. The viability of knowledge is dependent on its accuracy and accessibility. For the Internet to have value it must facilitate a convenient way to search, maintain and expand knowledge and communication.

This independence (Alexander and Tate 1998) leads to other problems, especially for students. Many students do not go to any library in order to conduct research. They do searches on the Internet and seem to take, for the most part, any information that is presented from the search. As discussed earlier, oftentimes this information may have little real value. In eastern Massachusetts there are many libraries both public and at the university level. Most of them have access numbers that are usually local calls to access the Minuteman or college and university holdings. This service is free except for the possible telephone charges. Once connected it is easy to perform title, author, subject or key word searches leading to substantial information that has probably passed through the gatekeepers in the non-web publishing world. From this query (assuming it returned some hits) a motivated student could either go to the library to look at or take out the book or if the item is of great value, order a copy through amazon.com or another Internet based bookseller, or buy a copy at a local bookstore. Given all these options many are too comfortable with only using the Internet and are abandoning better sources of information. I believe that in time many more books will be available free of charge on the Internet but most will have expired copyrights or have some charge associated with downloading. Either scenario is not so bad if one is looking for more in depth information.

Missing out on non-web published data is only part of the problem. The other area has to do with the performance of search engines. Before, we talked about excessive and non-relevant data that may be returned from a query. There is also the problem of information that may be missed. Up until about a year ago I used to search the Internet with search engines using them one at a time. I noticed that there were two flaws to this

approach. First there were many duplicates and second the number of hits would differ from search engine to search engine. I fortunately learned of www.metacrawler.com, which is a site that will search through several search engines from one request and return dozens of hits. This site consolidates the duplicates from the various engines and prioritizes the presentation based on the closeness of the keyword matches that the user requested.

There is also little reference to credentials or responsibility of articles on the web. Often authors' names and degrees and publisher information are omitted. This can lead to sites becoming soapboxes upon which people make unsupported claims or severely biased claims. The goals and/or aims of individuals are rarely listed. The web is also notorious for omitting dates of articles and supporting research for those articles.

Web sites are also fluid in that they may be changed frequently and they may actually disappear. Unlike hard copy, there is no stable state of information on the Internet, thus requiring researchers to print out the web pages that will be referenced in the research.

Hoaxes (CIAC 1998) are also a problem on the Internet. These are forms of trickery that can cause you to suffer wasted time or the destruction of some or all the data on your disk drive through a computer virus. Often hoaxes arrive via email as a message that has a sense of urgency built in with an aspect of a reward that usually appeals to greed. This leads to people responding usually leading to self-inflicted damage or to the inadvertent "spamming" of others.

People who commit email hoaxes often rely on the use of company names and employee titles in order to add credibility. When legitimate companies send emails most

react by assessing credibility of the message even at the lowest level of corporate worker. When an email is received from a corporate officer it is given credibility because many assume that it is backed by the reputations of both the company and the manager. A recent hoax was the Bill Gates email that led many to believe they could win \$1,000.00 by forwarding the email to one thousand people

If you happen to receive a virus warning, do not circulate it without verifying its authenticity through your system security administrator or your computer incident advisory team. Most valid warnings are issued by response teams such as CIAC, CERT, ASSIST NASIRC etc. and are usually signed with a PGP signature which can be verified. In other words, several organizations provide communication, assistance and electronic signature capabilities in order to help reduce the chance that a user will be susceptible to a virus. If the name of the warning sender is missing or has non-existent names, addresses, or phone numbers, it is probably a hoax. If you have any doubt about the warning do not send it to anybody.

Urban legends are fabricated stories that have been promulgated from web sites that carried false information (The AFU & Urban Legend Archive 1998). The sources may also include legitimate publications that may have been misquoted or had parts taken out of context. Most urban legends have no credibility. Using the evaluation techniques discussed later can help assure quality information.

Many problems have been cited thus far. Some are of major importance and others have less impact. All told, they can diminish the foundations of knowledge and research. The printed published information has had problems in the past just as the Internet has today. While these problems were in my opinion, more easily tackled it is

appropriate to note that peer review and the critical evaluation techniques mentioned above solved most of the problem.

QUALITY OF COMMUNICATION

The communication capabilities on the Internet are tremendous. Multimedia packages can be sent across continents in seconds. Clearly the speed, quantity and variety of information sent has improved. The quality of communication deserves review. Prior to the proliferation of email on the Internet, people had to write communications tailored to the recipient or by plugging in fields in a mass mailing. The cost of a mass mailing was high due to labor, paper and postage. The cost of a mass mailing on the Internet (outside of the mailing list costs) is almost negligible. One letter can be made to appear somewhat focused to an individual and sent to tens of thousands with only a few minutes of preparation (not counting the list itself.) The extremely low cost can lead to a lot of nuisance mail in one's Internet email in box. Luckily there is a way to get off the list by a return email with such a request to the sending location. Additionally many mass mailers on the Internet offer the email hyperlink for deletion from the mailing list with two mouse clicks!

In the case of problem or specialized communication the quality of life on the Internet can suffer. In the spring of 1998 my portal on the Internet changed their financial software to maintain stocks on my custom designed financial page. They warned their users that the change was coming and that the change would be seamless and invisible to the user except of course for the presentation format. The changeover occurred over a weekend and from that point on I could not get prices on four of my

stocks. Three were on major exchanges such as NASDAQ but one was a pink sheet stock (an informal exchange for companies with low capitalization). I read the help information to find that I was doing everything properly and my symbols were all entered correctly. I then sent an email to the designated location stating that I checked help and still got no satisfaction. The next day I received a return mail suggesting that I read the help information. Clearly, the portal help desk either did not read the mail or did not care to invest enough time to ask more questions or even to check the symbols on one of their workstations. My total list of symbols included forty or so companies that I watch on a daily basis. It was the email that convinced me to leave the portal for Yahoo!'s financial tools which showed me all the information on all the stocks I watch and did so after ten minutes of learning their system and reentering the stock symbols! I suspect that I was one of many that left the portal for one that either worked or had a help desk that responded with quality information or service.

This incident is just one example of poor treatment that can transpire on the Internet. The only positive aspect of this incident is that it would have taken seven days for the response if I sent the message via postal mail compared to the one day via email. I suspect such a communication would have been treated with more attention.

The nature of rapid superficial response has a tendency to dehumanize the Internet. We are drifting from dealing with people in order to deal with machines more and more in order to save time. Years ago I would deal with a human teller when I did my banking and I knew the people at the bank by their first names. Now I and many others appreciate the 24 hour convenience of a teller machine which is nothing more than a limited function computer on a network. In a research environment, at home or at a

workstation outside of a library, we no longer have the availability of a reference or research librarian to help us get what we really are looking for from the regular holdings, stacks or other libraries. We now tend to function more and more as independent and isolated researchers.

CHAPTER 3

NON-INTERNET SOLUTIONS

Before I address directly the problems raised in the previous section, let me review measures taken in other areas of society to protect the integrity of information. The successes and shortcomings of these measures inform my subsequent discussion of Internet-specific measures.

The not-Internet world has, both in the past and present, had the advantage of organizations that have organized, cataloged, guaranteed and certified information or products that were available to the general public. Additionally, these publications usually passed through a peer review process to help assure content viability.

The library systems that are available in the United States are highly organized through several systems including ISBN numbers, the Library of Congress Catalogue Card Number, as well as other numbering systems. There are many library oriented search engines that can retrieve information on published materials according to author, title, subject, key words etc. Such systems have solved many problems that would have faced a researcher if no system were available. It is important to note that this automated system started with a card catalogue that lasted decades and served researchers well

except for the fact that it had many limitations. There are two worth mentioning. The first is that the card catalogue was slow and if one person had a drawer it was unavailable to others. The second problem was that it did not tell you whether or not a book was available but only that it was inventoried at that library. Current automated systems solve these problems and in addition tell the researcher what books are available elsewhere on the system as well as cross-referencing capabilities.

UNDERWRITERS LABORATORIES

Underwriter Laboratories provide another solution (Underwriters Laboratories 1998, 1) to quality verification. This organization concentrates on products and not information but it still is an excellent organization in that it achieves its goals of consumer protection and product quality verification.

In the United States, Underwriter Laboratories has played a key role in increasing the safety level of products sold. To date the organization has evaluated over 16,500 types of products for safety hazards while also developing standards to test the products and registering the quality systems of organizations worldwide to various quality standards, including ISO 9000 and QS-9000. As a consumer I always look for the U/L label that is well known in the United States, and to some degree overseas, as well. I do not buy products without this label, based on my sensitivity to various information provided to me by friends and relatives over the years. I have been left with the impression that products that are not U/L approved have a greater chance of: 1) providing electrical shock that could be lethal, 2) proving a greater opportunity for electrical fire 3)

adding other dangerous risk to the user. Most products offered for sale have the U/L seal and that fact alone is reassuring.

There is, however, one major problem: fraud. Many companies importing goods to the United States know that the average consumer will look for the U/L seal when buying appliances and that the U/L symbol (Underwriters Laboratories 1998, 1) implies a quality that commands a higher price. In order to assure sales, some unscrupulous manufacturers are displaying counterfeit U/L labels on their products. This issue of counterfeiting can pose an objection to solutions found in the thesis presented in this paper. If too many counterfeit the approval indications on marked Web sites the value of the process of certification is clearly diminished. Because there are so many counterfeit U/L labeled products on the market today, the insurance industry has warned its companies, brokers, agents, inspectors, and the public about the counterfeit labels. The concern for the insurance companies is the added risk of loss of life and property. In communications they highlight the issue as well as inform the readers about the nature of the proper label.

The proper label consists of:

1. UL in a circle logo
2. The word "listed"
3. The Control Number
4. The Product Name

In Asia (China in particular) the U/L has added requirements to the label which adds a holographic background. All products from China must have the standard U/L information including the hologram in order to be valid.

ISO 9000

I mentioned earlier that the U/L (Underwriters Laboratories 1998, 2) adheres to several standards as well as its own. The ISO 9000 standard is one that is closest to the type of standards applicable to appliances and deserves discussion.

ISO 9000 is a general reference to a series of standards that were developed in 1987 to provide guidelines for consistent quality practices across international borders. The ISO 9000- ISO 9003* series provides general quality management and quality assurance guidelines as well as quality system models that can be used by any type or size of company anywhere on earth.

Many of the clauses in the ISO 9000 focus (Underwriters Laboratories 1998, 2) on how the customer and the supplier deal with each other. ISO registration helps “suppliers demonstrate their capabilities to meet quality requirements.” At the same time ISO registration helps consumers to receive a higher degree of confidence that the “products and services delivered can continually meet their requirements” (Underwriters Laboratories 1998, 3).

* The ISO registration is broken down into a three part series of standards consisting of: ISO 9001 is the standard used “when conformance to specific requirements is to be assured by the supplier during design, development, production, installation and servicing.” ISO 9002 is used “when conformance to specific requirements is to be assured by the supplier during production, installation, and servicing.” The ISO 9003 is used when conformance to specific requirements is to be assured by the supplier solely at final inspection and test.”

The U/L uses these standards as well as their own. There may be merit with this ISO approach to help in isolating WEB sites conforming to structure or quality according to a similar approach. The ISO 9003 type of concept clearly would allow for the standard to be easily obtained by anyone building a site simply by assuring and providing some basic information. This information may consist of author, date, referencing standards, and other items of information, all of which will be discussed, later in greater depth.

MODEL FROM ADVERTISING THE GOOD HOUSEKEEPING INSTITUTE

The Good Housekeeping Institute (GHI) is a subsidiary of the Good Housekeeping Magazine and the Hearst Corporation wholly owns both. Its purpose (The Good Housekeeping Institute 1998, 1) is product evaluation and consumer education as well as the approval and monitoring of advertising in the media. Although some question of true independence may be raised due to GHI's parent buying a lot of advertising, GHI appears to have performed a desirable function of checking for both quality of product and advertising accuracy. GHI may provide a model for an equivalent organization on the Internet.

GHI is broken down into departments specializing in engineering, home care, food, appliances, chemistry and environmental studies, nutrition, beauty products, and textiles. The staff is comprised of chemists, engineers, home economists, scientists, dietitians, beauty stylists, technicians, and general administrative personnel. GHI claims that their "talents, combined with services of specialized outside consultants, when required, allow the Institute to make expert determinations in virtually all areas of consumer evaluation" (The Good Housekeeping Institute 1998, 2). The Institute reviews

all advertising appearing in the magazine and renders an editorial judgment regarding acceptability of the products and advertising. It uses its collective expertise to prepare the product related and consumer-oriented editorial that appears in the magazine.

Editorial coverage includes the Institute Report page highlighting new consumer products and developments and the GHI help line, which details an actual claim made on a seal bearing product and the resolution.

The benefit to the consumer is that GHI will “replace the product or refund the purchase price” of the seal bearing products “with few exceptions” (The Good Housekeeping Institute 1998, 3). The benefit to the producer is that they may place the GHI symbol on their packaging as a mark of quality from an independent testing organization. This “Good Housekeeping Seal of Approval” and guarantee assures the customer that the product will not only perform as advertised, but also may have a warranty above and beyond the manufacturers warranty in case there is a problem with the product.

GHI and U/L both provide a quality testing service that is beneficial to consumers faced with a barrage of products. U/L seems to be an organization that goes into greater depth in terms of engineering analysis and safety testing of products. GHI seems to take an extra step in certifying the advertising and claims of the product.

CHAPTER 4

INTERNET SPECIFIC MEASURES: A GENERAL VIEW

There are people both as individuals and organizations who are somewhat analogous to U/L and GHI, working on systems that assure quality reviewed information on the Intranet and the Internet using bookmark based techniques. Let me review the different kinds of measures being taken before describing my own proposals.

INTRANET MEASURES

A classmate is involved in solving a problem in a large corporation[#] that has many users who complete written product and leave it as available on the corporate Intranet. When the information quantities were small, and few users relied on the Intranet for information, there were no problems or issues. Now that many peruse the Intranet, management has observed problems with use of either bad information or information that is not consistent with current management decisions or direction. The company does not want to censor work that already is available, but they want to let the readers know

[#] A classmate in a Practicum course had a substantial consulting engagement regarding Intranet design. I am unable to disclose the company due to confidentiality.

which sources of information are most consistent with the corporate mission and regulations within the company.

Two approaches to solve the problem are under consideration. The first approach would set up a master directory of bookmarks that only refer to company sanctioned documents. To get at the other documents would require a special navigation process that would be relatively cumbersome. The second approach, which is currently not the favored solution, is to embed in the company approved documents a key word that would indicate that the company sanctions the use of the document. There would be only one level of approval.

The first method mentioned above is a minor form of censorship. Because the company is private (although publicly traded) it is not subject to any First Amendment issues from a constitutional point of view. They can allow, management, to present or censor information on their Intranet in any way that they desire. I believe that access to all the information is desirable in this type of case because there exists an organization of professional workers who are producing information that is directly involved with the company. In this case, then, it is advisable to keep note of past failures and other items in case one can learn from them and avoid making the same mistake or "mis-decision" again. An open system can still allow the user to prioritize company sanctioned documents along with those that may not be.

INTERNET MEASURES

Bookmarked Portals

Yahoo! is a portal that built a site called Yahoooligans! and solved a related issue on an Internet level. The problem is that parents and teachers may want to restrict the access their kids have on the Internet, not just bypassing smut or hate, but more constructively to focusing on web sites that are geared to the children themselves. This is synonymous with asking for a search of sites that are appropriate for children's entertainment. While the selected sites may not have every or even most of the number of possible children's sites there would certainly be enough bookmarks for many days or weeks of appropriate children's entertainment and learning. Yahoo! has installed a site on their portal that is strictly for children. A teacher or parent can set up a "short cut" or macro to take their child right to this site and feel comfortable that there is very low risk of inappropriate material.

Efficient Search Engines

There are procedures that can help the researcher minimize the amount of time wasted retrieving information on the Internet. People can be trained to avoid wasting too much time by using some simple techniques of searching and evaluating Internet based information.

There are many search tools available on the Internet. These consist of, but are not limited to, Lycos, Infoseek, Altavista, Hotbot, and Yahoo!, etc.

Lycos:	http://www.lycos.com
Infoseek	http://guide.infoseek.com
Altavista	http://www.altavista.com
Hotbot:	http://www.hotbot.com
Yahoo!	http://www.yahoo.com

Each site has a search engine that allows the user to look across the web (in terms of the site's index strength) for information. It is important for the user to learn the search techniques for each of the sites. Some sites are called meta-sites and they have the ability to search many of the above mentioned sites at the same time, returning with separate windows of information for each site or a single combined list.

Some of these sites such as Lycos have previewed sites. At Lycos' Top 5%, Lycos staff reviews and rates the top five percent most active sites for content and user interface quality. While this is helpful for casual use, such as sports or music, it does little, if anything, to aid in a research review environment because the number of sites is so few. In 1998, Lycos had over 200 people working full time maintaining this review function at great expense.

There are meta-search sites such as MetaCrawler: <http://www.metacrawler.com>, WWW (World Wide Web Worm), and <http://guano.cs.colorado.edu/home/mcbrian> which consolidate the information from some of the sites mentioned above. Metacrawler automatically searches the indexes of up to nine other search engines including many aforementioned and returns a combined result on a single screen. WWW searches an automatically generated index of many web site with one set of results. These can really save a lot of time when you need to do sweeping searches.

Search Statements

One must learn the various structures of the search in order to formulate searches that return what is intended. It is very important not only to know what to look for but also to find key words of that subject that can be used in a search. If you are too broad in the search you may get not only too many items returned but also too many irrelevant items. The easiest way to format your statements is to enter your key words on the “metasearch” site mentioned above and it will automatically format your search for several key search engines.

Saving The Good Information

One should save all the valid information on your system as well as the executable object code of the browser that you are using. All too often sites disappear and you cannot pull up the data again or, worse, you cannot prove where you got the data. Sometimes the browser version changes from one brand or release to another and you may have trouble pulling up your saved information. If you cannot do the aforementioned, be sure to print out the pages that you want to save.

Evaluation Techniques

The need to evaluate sites is clear. We know that the quality of sites differs dramatically thus necessitating the need to use both existing techniques and new techniques for evaluation. As discussed in Chapter I, there are five traditional evaluation criteria that can be used to evaluate printed material that apply in the area of web research.

Specific Technological Proposals

There are probably many technological approaches that can be designed and implemented to solve the thesis problem. Several solutions will be discussed, including two extreme solutions.

The first extreme solution is to do nothing at all. Simply let the Internet technical and social impact flow in any direction it may. This option does not reduce the problems that are cited in the beginning of this paper. The do nothing approach is better than censorship. Hopefully the Internet can evolve through user input and demand into a viable resource for research quality data.

The second extreme solution is to censor (Page Authors 1998) all low quality, hateful, harmful and pornographic information on the Internet. This would have to be rejected because not only does it violate First Amendment rights of freedom of speech but there would be a public outcry against it. Also, such attempts will cause public outcry and focused legal attacks from watchdog organizations like the ACLU. There would even be resistance from areas that one may not expect. For example Yahoo! sponsors a page called "Families Against Internet Censorship." This group believes in First Amendment rights and the absolute responsibility of parents and guardians to be educated enough to prevent bad or harmful information from getting to their children. The article talks about the implementation of filters that would assist in this endeavor.

We must differentiate censorship for children from that of adults just as the ancient Greek philosophers. Because children may be so easily influenced and affected by what they see, it is an approved behavior to insulate children from undesirable

information. For the protection and provision of quality Internet content for children there are already solutions in place. Parents and guardians select child-oriented sites for their children. The browser options to leave the site are disabled to prevent roving. If the options are not disabled and the child is computer savvy, the installation of a smut and/or hate filter will help to prevent exposure to unwanted information. This process of child protecting a computer can easily be taught from a few pages of text as long as the parent or guardian has a good working knowledge of PC's and the Internet. This is a desirable process but is dependent on the parents, some of whom may not have the time or expertise to do this.

In addition to censorship being an unlikely possibility, it is also not able to be implemented. Censorship never worked in the United States with books, magazines or speech. It is now so easy to set up a home page that is not only impossible to prevent bad information from getting on the Internet, it is relatively easy for those who want to broadcast any information to do so very easily. In less than an hour I can use a tool to set up a web page with any content I want, get it listed on several search engines, and "spam" the new pages existence to hundreds of email users, and chat room residents.

ISP Or Portal Control

Technical solutions provide the potential for unlimited possibilities. However, there are potential drawbacks in terms of cost, time to develop, implementation, legal issues, anti-trust issues, public acceptance issues, etc. All of them must be implemented with a new or altered process and some form of education or training for the user.

The education required for all of the following solutions in terms of the end user can be described as very simple. The solutions all have a basis in the current browser formats or are simple modifications of entry and result screens. Such modifications are easy to adapt to, just as the Internet users have adapted easily to the many browser releases offered over time by Netscape and Microsoft. Indeed, it is the presupposed ease of learning that can make the following solutions more acceptable and more usable.

A partial solution that can be called both technical and educational is that of insisting on complete citations for any web site or at least for any web site that wants a quality stamp of approval. These citations should include at the very least, who the author(s) is(are), where the sources came from including citations, when it was written, etc. These guidelines should be adhered to by web developers and should be available as part of key word accessibility for all search engines so that the user can prioritize those referenced sites.

Each site that complies with this may display a seal of approval like the U/L seal. The problem exists, however, that page publishers may replicate the stamp without adherence to guidelines. This means that counterfeit stamps may fool casual browsers as those who are plagued by false U/L stamps are today.

Fred Goldman, a veteran data processing CEO of Spot Systems, Inc. in California, points out that an organization can inspect these sites for compliance and issue a blessing such as a stamp. Here we have a cost issue where a new expense is added in order to count as a valid site. The counterfeiting problem is still there unless the list from the certifying agency is compared to the selection for validation. The only people that will pay for all this will be the web owners who may be quality publishers but who do not

want to pay for the added seal of approval. This would be a loss for the researchers who will thus miss the query hits.

Another issue arising from this is who controls the accreditation agency. No corporation nor government agency can control this without fear of possible bias or information control problems. Perhaps a structure like an agency such as Underwriters Laboratories and/or ISO 9000 standards may be appropriate.

A central approval authority for all web sites, including content, could have tremendous control over what is deemed an appropriate and a quality site. A site mentioned above called *WC3 World Wide Web Consortium* at www.w3.org was created several years ago to help the Internet to grow and to promote standards. They have many services including technological page design checks for the web page software that one designs as well as a three hundred dollar service that can buy a person to review the content of a site. This person will do an evaluation of the authors and the information and references just as I suggest should be done in the evaluation method mentioned above.

There are two severe problems with their approach. The first has to do with cost. If three hundred dollars per site is extended over say fifty million sites of academic interest, the cost would be fifteen billion dollars. As the sites are modified they may yet have to be reviewed again at some additional cost. Most people that provide information on the Web are unlikely to pay three hundred dollars to be critically reviewed.

The issue of manpower also arises out of this endeavor. I suggest that an adequate number of qualified reviewers can not only be unattainable, but also the time to complete the task will be many years, which may be long enough that the original

content is obsolescent. Thus the review process fails to be timely which is an important attribute of most vital information.

Lastly, if this organization is given broad powers, there is risk that it may lead to biased control or censorship, whether government or privately run. It will also have tremendous costs. These costs and dangers outweigh the potential benefit of such an organization.

Portals or ISP's may assume the function of accreditation or control but would eventually have to be treated as large organizations that may develop bias in web site selection and compliance. While there are organizations that have the required expertise for such an endeavor at start-up, they would have to be closely regulated to insure their fairness in the industry.

Portals, ISP's or search engine companies would be best suited to write an application that could apply to all categories of users who want to benefit from the product with quality search precision.

This approach will result in an information appliance for research. Unlike hardware appliances, this appliance will be invisible to the user and will be the result of a user-focused process of discovery and design that will lead to the design of the ultimate solution.

Staying within the framework of this paper I will attempt a database based on my research experience. This database is analogous to the workings of a fine tuning knob of a radio. One can always tune in a station but sometimes the fine tuning option can eliminate the unwanted interference or noise.

This application would allow users to accomplish two critical product foundations to accomplish quality searches as defined by the user. The first is the capability to have the browser or a user file maintain a record of search and view patterns of the user especially when conducting research. The record below has a first column that refers to the full field descriptive name, the second column has the data field name whose parts are structured to make coding easy and the third column defines the length of the field (for now these are only maximum lengths subject to future revision). The records in this file would maintain at a minimum the following data fields:

user	pf_user	20 Characters
sequence number	pf_sequence	20 Characters
project or subject	pf_subject	20 Characters
the search engine used (if any)	pf_search_engine	20 Characters
URL	pf_url	20 Characters
site creation date	pf_site_create_date	8 Numeric
beginning date and time of view	pf_beg_date_time	8 Numeric
search statement used	pf_srch-stmnt	40 Characters
search result URL	pf_srch-result	40 Characters
URL hits overall	pf_url_hits_td	10 Numeric
beginning date and time of view	pf_beg_date_time	12 Numeric
ending date and time of view	pf_end_date_time	12 Numeric
adjusted duration	pf_duration	8 Numeric
user hits in site	pf_user_hits_site	10 Numeric
quality level judged by user	pf_user_qual	10 Character
quality level judged by agency	pf_user_qual	10 Character
quality level indicated in site	pf_user_qual	10 Character
adjusted duration	pf_duration	8 Numeric
user hits in site	pf_user_hits_site	10 Numeric

Another requirement is the ability to group these files according to requirements of the user into multi-level bookmarks in a manner similar to the methodology of the Netscape and Windows Internet Explorer browsers. An additional file to manage chapter bookmarks for sites will consist of a minimum of the following fields:

user	pfbk_user	20 Characters
sequence number	pfbk_sequence	20 Characters
category	pfbk_category	20 Characters
level	pfbk_level	6 Numeric
URL	pfbk_url	20 Characters
beginning date and time of view	pfbk_beg_date_time	12 Numeric
URL hits overall	pfbk_url_hits_td	10 Numeric
beginning date and time of view	pfbk_beg_date_time	12 Numeric
ending date and time of view	pfbk_end_date_time	12 Numeric
adjusted duration	pfbk_duration	10 Numeric
user hits in site	pfbk_user_hits_site	10 Numeric

The two files mentioned above might be modified substantially depending on the depth and breadth of data that user profiles may have. The data allow the query of quality by allowing the search for information such as “present the sites that had the longest viewing times, within the last n years, and the greatest number of hits” and, if available, present in order of overall quality by agency and site. This statement is merely the selection of data fields described in the aforementioned file definitions. Once the user has the subject area down, such a query acts to make the Internet more of an easy to use data gathering appliance for quality information.

Donald A. Norman (Norman 1998) suggests that the way this approach is used should be invisible to the user and should be developed according to the user’s needs. Additionally, in order to work as a universal appliance for the Internet, it must be standardized so that it may be accessed and used for a multitude of applications and

purposes. I must note that Norman in his book concentrates primarily on hardware and operating systems. I have extended his reasoning into this issue.

All of the data will be collected automatically as a by product of browsing except for a few fields. These include project and quality levels judged by user and agency, which would require input from the user. Mr. Weiskel of Harvard University's School of Divinity and author of reviewed web sites, stated in an interview that no user could be bothered to input any evaluative information when done viewing a site. Mr. Goldman, CEO of Spot Systems, stated that if the search were an important part of a project it is likely that the user will make a quick remark or mouse click on a value when leaving a site. In a variable length record these fields would not take any significant disk space if unused so they should stay in the database for the sake of occasional use.

Given that there are fields for the evaluative use of the user, an agency enhances standards, and there is the capability for profile creation, there is still the need for the user to evaluate the site properly and in a method similar to that which was proposed earlier in the paper. Poor use of this tool will only create a garbage selection database. Such use will be less taxing when the results have a greater value.

In the absence of the input of data, the other fields can serve as a value indicator of the web sites visited. The selection query of the sites visited within a subject area that had two or more hits in the URL (as determined by root references) with an elapsed time of greater than one minute may be an indicator of quality.

The information contained herein can serve to help the user in the search function best if the site adheres to a standard and if the site maintains the quality input entered

upon leaving by the user. The problem that may have been countered here has to do with the possibility that the site may alter the user quality values associated with the site.

If at least some of the better sites adhere to standards in site construction and content the user may be able to select a query that requests currency in time, complete citations within the site, and other values along with the subject key words. The result list should not exclude the hits of the lesser sites but should list those sites that have better standards first assuming similar subject conformance.

If we assume that there is the ability to get a standards rating that is available to all web developers and some users input high quality responses, the Internet can build a base of sites that have exceptional quality. Mr. Weiskel argues that this will not be the case because there is little likelihood that a standard will be adhered to and that few, if any, will offer comments to sites. His insight is based on the fact that there is no control over the users or the standard setters who do not exist. That, however does not preclude other options that can enhance the lives of those who rely on the Internet for solutions.

Even if we relegate a universal solution to the category of "very unlikely" due to lack of control, we have other scenarios where control can be present. These are the individual users who can improve their own environment by categorizing quality in sites that they visited for research quality later. This can be accomplished by building the database mentioned above as a byproduct of Internet queries. The user then can revisit according to quality ratings as he/she closes in on the format of the research project.

The other scenario for likely success is in the Intranet environment of small to large organizations, both public and private. Building a catalogue of corporate information according to both research and sanctioned corporate policy and mission

allows members of the organization to find information that is of common interest to their peers faster. For instance if one department is working in a particular area, and a member of the same or other department is querying the Internet, the URL's that overlap may be presented either first or with some indicator quality based on the input of other users in the organization. This allows for greater efficiency and control for the organization and its users without any loss of information. To facilitate this, central company servers will keep copies of the bookmark information up to date.

CHAPTER 5

CONCLUSION

I have reviewed the options and the efforts of non-Internet solutions. I am at first tempted to suggest that a massive attempt to find a fast and comprehensive way to a solution be established. Jealousy and control issues would probably lead to failure among the major influencers. A better solution is to allow for atomistic evolution of a solution(s) that would follow certain processes. Any solution should retain a provision for the user to verify the quality of the information before using it, just as a pilot goes through a checklist before taking off.

The key to success is to allow for search engines to behave as more of an appliance. According to the definition by Norman (Norman 1998), this means that the user should be the central point of design focus and also the least affected by the execution of the solution.

The implementation can only be accomplished at a level large enough to support an effort both financially and managerially. The Internet-wide solution from the outset is nearly impossible. The costs could run into billions of dollars and the project could require much of the data processing technical staff in the United States. Even with these

resources, the project could take years. An approach using an Intranet such as one found in a large corporation and/or university would provide a very satisfactory environment.

An organization of several thousand users provides for a sound development. The user or customer can be analyzed in terms of needs for the purposes of design. Norman's approach of assessment, market study, combined market study and assessment, design statement, mock manual writing, prototyping and continuous reiteration of the prior steps, as needed, are the basis of a usercentric development cycle. His approach is similar to techniques already in use and used by my staff in our most successful product design efforts. This approach can be easily adapted in the Intranet that will be a trial site.

The project team will be hired specifically for the project and will not have any reporting or access limitations. Their task will be to assess the habits of users who must complete assignments relying on research assistance from the Internet or member libraries that place their holdings on the Internet.

Once the user needs are determined, the team looks at existing products that may already be available and what they look like. They are likely to find things like search engines and the Minuteman Library System if the organization is in the Boston area. These products will be studied for look and feel and functionality. In the event that these products cannot work, they either would be modified, or new ones will be custom designed and written.

Privacy is an issue that has to be addressed. Users who regularly contribute evaluative information to a site or group of sites may desire anonymity. In order to accomplish this a firewall must be planned to keep the actual names and addresses of the user from access in the Intranet or Internet.

The users' needs will be put together in a document that may include my file definitions intact, modified or not at all. As long as a better way is found to address the inadequacies mentioned earlier in the paper, a viable user-friendly result is all that matters. Screen mock-ups will be designed and presented to the users in focus group settings. Various scenarios will be created to show how the system may work.

A sample capabilities manual and users' manual will be written. This manual will hopefully be short and easy to read. If the product is good, the manual should not be needed as the software will be intuitive enough to eliminate the need for any manual.

The next steps include writing prototypes satisfying the requirements set forth above. There will then be a critical process of testing and revising until there are more requests for changes.

My vision is that this product will work as follows: The user will use a simple search engine that will ask for user-defined definition of how restrictive the filtering for quality should be. The user may request parameters mentioned above relating to standards of length of use, hits, stated quality of information etc. The search engine will also return results of books that may have associated information by querying the local library network by subject and title as a minimum default.

The results are displayed in a user-defined format. At a minimum, the results will be presented with sites that have had some level of prior review attached to the master list that is maintained by the Intranet that the user is accessing. This allows for the ordering of results first by those that had positive reviews followed by those with no reviews and no content value. As the user peruses the information more statistics about each result are being accumulated and updated in the appropriate Intranet files. This allows for the

next user in the Intranet network to realize benefits from the behavior of the prior users of the data or web site. The user will also indicate his application and success or failure with the information on an exit screen. I believe as Norman does (Norman 1998) in that in order to have any user-centric product success there must be some disruption and interaction. In time, user responses may become unnecessary if the other indicators are successful as product quality descriptors.

The ecology of the users will continue to build information that enhances the recognition of quality simply by being used. A closed Intranet environment is more likely to get users to rate sites once they are done with them. This will add substantially to the quality of the information acquired. After all, one can look out the window while the time per site increases thus giving inaccurate information. A rating on the other hand, would supersede the automated tallies that the system would provide.

Perhaps there may be enough enthusiasm for people to build up their own research villages by letting members set up their own critiques and research home pages. Tripod Inc. did this successfully for home page development and their effort had no real focus.

After several Intranets have experienced life with their information enhancing products, they will try to expand their use (if successful) through sales, marketing or better yet through free distribution. These possibilities are fine as long as standards are developed which can be widely used. Without standards, the character of the information gathered may change and user input may be weighted differently. Conformity in this endeavor can only add to the usefulness of this research information appliance.

There is a story about Frank Lloyd Wright, the famous architect. Wright was hired to design a rural college campus. When it was completed and students were enrolled, Wright was called to task about failing to design or specify sidewalks. He told the irritated trustees that nobody can determine in advance where people will go or what paths they will take. Because of this he planned to wait until after the first year so that he could place sidewalks where the grass was bare from use. By extension, any attempt to design these standards before Intranet review is used will be fruitless.

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